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ABSTRACT

Conceptualizing stress as an interaction of organizational or work characteristics (stress stimuli) and individual characteristics (stress resistance), this paper reports a study of teacher stress in 42 elementary school organizations and 45 secondary school organizations. Organizational stress is operationalized as the aggregate average response to a self-report inventory on the teachers' psychological and physiological states on the job. This analysis does not address the variance within an organization predicted by individual job characteristics and personality characteristics, but analyzes stress using organizational scores, emphasizing the shared variance in stress within organizations. Differences emerged between predictors of psychological and physiological stress and between predictors of stress for elementary and secondary teachers. Among significant independent variables were rationality of promotion process, student/teacher ratio, decisional deprivation, role ambiguity, teaching support ratio, supervisory behavior, and routinization. The importance of this type of analysis is concluded to lie in its implications for alleviating stress by altering organizational structures and work processes. (MJL)

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Organizational Analysis of Stress:

The Case of Elementary and Secondary Schools

In: Consensus and Power in School Organizations

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Abstract

This paper is an organizational analysis of stress in 42 elementary school organizations and 45 secondary school organizations. Organizational stress is operationalized as the aggregate average response to survey questions on the teachers' psychological and physiological states on the job. The predictors of stress differ for elementary school organizations and secondary school organizations. Among the independent variables emerging as important are role ambiguity, the rationality of promotion, and supervisory behavior.

Biographical Note

Dr. Samuel B. Bacharach is an Associate Professor in the Department of Organizational Behavior in the New York State School of Industrial and Labor Relations at Cornell University. He is, with Edward J. Lawler, co-author of two books in the field of organizational behavior entitled Power and Politics in Organizations (1980) and Bargaining: Power, Tactics and Outcomes (1981). His most recent publication is a book published by Praeger entitled Organizational Behavior in Schools and School Districts (1981).

The issue of stress has recently received a great deal of attention from practitioners and scholars alike (e.g., Cooper and Payne, 1978 and 1979; Hamilton and Warburton, 1979; Cooper and Marshall, 1980; Ivancevich and Matteson, 1980). Indeed, judging from the volume of literature and treatment of the subject, it would appear that job stress has replaced satisfaction as the primary measure of the qualitative nature of work.

The incidence of stress among teachers has received a particularly large amount of attention in the last few years (Phillips and Lee, 1980; Kyriacou and Sutcliffe, 1977, 1978, and 1979; Swick and Hanley, 1980). The demands brought to bear on teachers in the conduct of their work are varied; the teacher acts as administrator, lecturer, disciplinarian, counselor, and more. He or she regularly deals with children or adolescents, peers, superiors, parents, and other members of the community at large. The teacher is expected to keep order on the one hand and motivate students to think creatively and use imagination on the other. At the same time, teachers must deal with hostile communities that have become increasingly inclined to reduce school budgets, layoffs in the face of declining enrollments, and increases in violence in the schools. For these reasons and a host of others, the incidence of stress among teachers "...has reached epidemic proportions in some school districts." (Sparks, 1979).

While there have been numerous studies of teacher stress in the last decade, these studies have been deficient in several respects. Briefly, by failing to deal with stress as an organizational phenomenon, researchers have failed to relate various organizational structures and processes to stress. As such, means by which the organization might be redesigned in order to lessen job-related stress have not been uncovered. Nor have

the differences between the experiences in secondary and elementary organizations been systematically analyzed in this regard.

This paper addresses these limitations of earlier research.

Conceptualization of Stress

In order to fully understand the implication of stress at work, it is critical to consider the notion of stress as emerging from the interaction of two factors: stress stimuli and stress resistance. Stress stimuli are the organizational characteristics or work characteristics which initiate a stress reaction in a given setting. Stress resistance refers to those characteristics of the individual which determine the point at which stress stimuli will engender a negative response in that individual.

Stress may be operationalized as that point at which the magnitude of the stress stimuli exceeds the individual's capacity to resist. In this context, stress resistance is an individual attribute, a personality trait, whereas stress stimuli are characteristics of the organization and the work process. Stress is a function, then, of the interplay between personal and organizational characteristics. Clear examples of this conception of stress may be seen in the literature dealing with the personality-environment fit (McGrath, 1976; Brief, et. al., 1981).

For an organizational structure or work process to be a stress stimulus, it must be phenomenologically interpreted by the individual (Lazarus, 1966; Lazarus and Launier, 1978). That is, the individual's perception of the organizational structure and work process, rather than the objective existence of the structure or work process, is the stress stimulus. For example, it could be argued that the worker's perception of the size of the organization would be more predictive of that individual's stress than the objective measure of organizational size. This point is, of

course, at the heart of current debate in organizational theory, the debate between those who cast the organization as a reified structure and those who view the organization as individually constructed realities. If we emphasize the latter perspective, then the personality characteristics that determine the stress resistance points must be taken into account when examining the stress stimuli.

Two important questions emerge in this regard. First, how do we study stress as a response outcome without confusing it with stress resistance? Second, how do we study stress without confusing the examination of stress stimuli with the personal characteristics of the individuals perceiving those stimuli?

We approach these dilemmas by conducting an analysis which emphasizes both stress stimuli and stress as characteristics of the organization, not simply as characteristics of the individual. In the analysis, we employ measures of the average of the aggregate survey responses of the organizational members. Thus, we report a measure that represents the average perception of the organizational structures and work processes as stress stimuli and the average level of stress reported by the individuals in the organization. Although we cannot eliminate the explanatory role of individual differences, by assuming that individual characteristics are randomly distributed within and across the organization, this methodology permits us to place primary emphasis on the aggregate reality.

This has critical implications in terms of organizational design. Stress and stress stimuli can be viewed not simply as an environment-personality mismatch unique to the individual, but as a consequence of the interface between the "average work reality" in the organization and the average worker. Indeed, to examine stress on the individual level

is to fail to come to grips with its increasing commonality.

This is an important argument from the point of view of both management and labor. For management, guiding redesign by the average reality of organizational members means that the redesign is likely to have maximum utility. The "average" audience will benefit from the effort rather than particular individuals, a point that is particularly critical in larger organizations. From the point of view of labor, this approach has direct relevance for conduct at the bargaining table. Any empirical argument presented by labor during negotiations over working conditions that is based upon individual characteristics is likely to be rebuffed by management as an attempt to deal with the problems of a select few individuals who have the "wrong type of personality" for a given job. An investigation directed at the average reality of organizational members is not subject to such criticism for the reasons alluded to above.

A further debate in the operationalization and measurement of stress centers around the use of self-report measures versus the utilization of more objective indices. The essence of this debate lies in the distinction between the medical conception of stress as diagnosis of symptoms and subsequent cure and the psychological conception of stress as a definition of the situation as the critical factor in defining stress. Those opposed to the use of self-report measures appear to assume that there can be a false report of stress. It is the premise of this paperthat it is precisely the self-definition of stress that is important. Stress should be seen as the actor's definition of his or her reaction to a situation, not as the results of an objective analysis performed by a third party. There is an implicit conservatism to the use of objective measures insofar as a worker would be considered under stress only when diagnosed as being under stress,

not when the worker feels under stress.

Research Methodology

Sample--This report is based on survey data collected in 83 school districts in New York State. These districts are a random sample stratified according to geographic location, size, wealth of the district, and district expenditures. Four regions in New York State were utilized for geographic location. The sample included 30 districts from the Binghamton-Elmira region; 14 districts in the Rochester region; 22 districts in the Syracuse region; and 17 districts in the Westchester region. Average daily attendance in K-12 for each district was used as an indication of size. The average size of our sample is 3,128. The size of the districts ranges from a low of 277 to a high of 12,205. Assessed valuation was employed as a measure of district wealth. The average assessed valuation in our sample is $65,951,748; the range is from a low of $1,904,589 to a high of $379,246,706. Expenditures are indexed by the total general and federal aid expenditures for a district. The average for our sample is $7,433,854. The range of expenditures goes from a low of $630,968 to a high of $28,308,727.

For each district,

teachers in the largest elementary school and largest high school,

received questionnaires. Out of 3,200 teacher questionnaires sent out, 2,247 usable surveys were returned, for a response rate of 70%. The data employed in this study are aggregated to the school level. Only those districts with a response rate of 30% or higher are included in the aggregate sample (N = 48). We decided to utilize a school level aggregation in order to capture the organizational differences between elementary and secondary schools which would lead teachers in each type

of school to experience different levels of stress. The final sample employed contains 42 elementary school organizations and 45 secondary school organizations.

Measurement of the Dependent Variable - In this study we measured stress in terms of both psychological and physiological components. Items in our self-report inventory consisted of a list of symptoms adopted from Langer (1962) and Caplan et al., (1975). For each item, respondents were asked to specify how often they experienced the described condition. The scale consisted of four possible responses: 1 = seldom or never, 2 = occasionally, 3 = frequently, 4 = almost always. It should be noted that by combining the categories of seldom and never, we employ an approach more conservative than that adopted by many previous survey researchers, who count seldom as a separate and positive response.

Psychological stress was measured using the following items:

Have you experienced any of the following during the past month on the job?

1. Periods in which things don't seem to work out or in which you wonder if anything is worthwhile.
2. You were bothered by confused thoughts or difficulty in concentrating.
3. Periods of forgetfulness or loss of memory.
4. You were bothered by a sense of anxiety or nervousness.

In addition, have you experienced any of the following in the past month?

1. You felt unable to rely on or talk to anyone, even friends.

Cronbach's alpha was .80 for the scale of psychological stress.

Physiological stress was measured by the following items: Have you

experienced any of the following during the past month on the job?

1. You had spells of dizziness.
2. You were bothered by having an upset stomach or stomach ache.
3. You were troubled by headaches.
4. You were in ill health which affected your work.

In addition, have you experienced any of the following in the past month?

1. You had trouble in getting to sleep or staying asleep.

Cronbach's alpha was .71 for the scale of physiological stress.

The stress measures were tabulated for elementary and secondary schools as the aggregate average of the responses to the survey items described above. We should emphasize that when we use the terms "stress", "organizational stress", etc. in the following sections, we are referring to the aggregate average reality as reported by teachers in either elementary or secondary schools. In the context of our earlier discussion, our examination is of the predictors of variance across organizations rather than within a single organization. Indeed, the variance within an organization predicted by individual job characteristics and personality characteristics is not accounted for in this analysis. By analyzing stress using organizational scores we emphasize the shared variance in stress within organizations and as such examine the differential predictors of variation across organizations. Table 1 presents the appropriate means, ranges and standard deviations of our stress scales.

Insert Table 1 about here

Table 1 indicates some obvious characteristics about our population. First, these are not extremely high stress organizations. Second, on the average, there are not dramatic differences between psychological and physiological stress on the elementary or secondary level. Finally, there do not appear to be large differences for the mean scores between elementary school and secondary school stress.

Hypotheses and Independent Variables

In addition to asking teachers to assess their physical and psychological states at the workplace, the survey instrument included questions asking teachers to rate the dimensions of their work. As was the case with the dependent variables, organizational scores were created for each of the independent variables. Table 2 presented at the end of this section shows the means, ranges and standard deviations of the independent variables.

The following models present the hypothesized relationships between the independent measures of organizational structure and process and the dependent measure of stress. In the hypotheses there is no differentiation between psychological and physiological forms of stress nor between secondary and elementary school. These finer distinctions will be detailed in the discussion of our findings.

Staffing and Enrollment

It is commonly assumed that the greater the number of students in the classroom, the greater the reported level of stress among teachers. For teachers, as for other occupations, an increased workload leads to greater pressure which, in turn, manifests itself in stress.

Two dimensions of size must be taken into account in an examination of schools: the total enrollment of students and the student/teacher ratio. These are clearly two separate phenomenon. Enrollment is

reflective of the general atmosphere within a school, and the student/teacher ratio is indicative of the direct demands made upon individual teachers with respect to their own work. There may be schools with large enrollments and high student/teacher ratios or those with large enrollments and low student/teacher ratios.

Enrollment was measured as the number of full-time students enrolled in each secondary and elementary school. The student-teacher ratio was measured as the number of full-time students enrolled in each school per full-time teacher in that same school.

The demands brought upon teachers by high enrollment or high student/teacher ratios may be mitigated by increasing the staff support which teachers receive. Staff support may be of two forms: administrative support, and teaching support. Administrative support primarily reflects the ratio of middle-level supervisors to teachers. To the degree that these supervisors facilitate organizational communication, and, as such, more immediate contact between classroom teachers and the school administration, we would expect that the higher the ratio of administrative support, the lower the level of stress. On the other hand, if a high ratio of administrative support is viewed by teachers as increasing pressure due to more direct supervision, it may have an opposite effect and increase reported stress.

The ratio of teaching aides to teachers taps the degree to which full-time teachers have assistance in their everyday classroom activities. As with the case of administrative support, on the one hand it can be assumed that the more assistance teachers have, the fewer the direct demands brought to bear on them, and thus the lower their level of reported stress. On the other hand, if the presence of teaching aides translates

into greater supervisory duties for the classroom teacher, we might expect that the reported level of stress would increase as the ratio of teaching support increased.

The ratio of teaching support was measured as the ratio of full-time equivalent teaching assistants to the number of full-time teachers in each school. The ratio of administrative support was computed as the total number of principals and assistant principals per full-time teachers in each school. For the purpose of empirical verification, two hypotheses may be tested:

Hypothesis 1: In organizations with larger enrollment and higher student/teacher ratio, the level of reported stress will be higher.

Hypothesis 2: In organizations with higher ratios of administrative and teaching supports, the level of reported stress will be lower.

Supervision

An obvious source of reported stress may be the type of interaction the teacher has with his or her immediate supervisor. In the case of professionals such as teachers, who may view their supervisors as peers rather than as superiors, supervision may be an especially critical stress stimulus. In examining the interaction between teachers and their supervisors, we must draw a distinction between positive supervisory behavior and negative supervisory behavior. These two modes of behavior must not be construed as dichotomous ends of the same variable, but rather as phenomenologically distinct. Positive supervisory behavior implies a supervisor who exhibits appreciation of the teachers' activities and tries to solicit direct input from teachers. Negative supervisory behavior implies a critical orientation in which the supervisor's basic mode of communication is criticism, and on a whole the supervisor is

unaware of the subordinate's work activities. The simplest hypotheses resulting from this conceptualization would be:

Hypothesis 3: In organizations in which the reported levels of positive supervisory behavior are higher, the level of reported stress will be lower.

Hypothesis 4: In organizations in which the reported levels of negative supervisory behavior are higher, the level of reported stress will be higher.

Positive supervisory behavior and negative supervisory behavior were constructed from questions in which respondents were asked to indicate how often their supervisor "talks to you in the following ways," (1 = seldom or never, 2 = occasionally, 3 = frequently, and 4 = almost always). Positive supervisory behavior was tabulated as the average of the responses given to the following items:

1. Shows appreciation for your work, shows confidence in you.
2. Explains things or gives information or suggestions.
3. Asks for your suggestions or opinions.
4. Asks for information, clarification, or explanation.

Negative supervisory behavior was computed as an average of the responses for the following items:

1. Criticizes you, refuses to help or is unnecessarily formal.
2. Gives excess, unnecessary information or comments.

Work Process

The mode by which work is conducted has been cast as a primary predictor of stress in organizations (Kahn, et. al., 1964; French and Caplan, 1972). It appears that the underlying assumptions regarding the relationship between work process and stress are based on the effect of uncertainty on the worker. The most widely accepted assumption is that uncertainty in

the work process will increase the reported level of worker's stress. As Kahn et al. point out, this is because uncertainty blurs expectations and minimizes predictability, thereby placing the worker in a turbulent work environment. Uncertainty in the work process may be viewed as multidimensional, but for the purpose of this paper the work process is measured in terms of work routinization and role ambiguity.

Hypothesis 5: In organizations in which the reported levels of work uncertainty are higher, (with lower reported routinization and higher reported role ambiguity), the level of reported stress will be higher.

The reverse argument could also be made. It may be the case that a report of high routinization and low ambiguity in terms of role expectation is indicative of a mundane work process which, because of its alienative nature, will increase stress.

Role ambiguity was computed as an average of the answers to the following survey items: (Adopted from Rizzo and House, 1970)

Please indicate how true the following statements are of your work experience (1 = very true, 7 = very false):

1. I feel certain about how much authority I have.
2. I know that I have divided my time properly.
3. I know what my responsibilities are.
4. I know exactly what is expected of me.

Routinization included the responses to the following items: (Adopted from Bacharach and Aiken, 1976)

1. There is something different to do here every day.
2. In my position, I need to learn to do more than one job.
3. For almost every job a teacher does there is something new happening almost every day. [Items 1-3 coded 1 = definitely true, 4 = definitely false]

4. Would you say your work here is: 1 = very nonroutine,

4 = very routine.

Participation in Decision-Making

As organizations become larger and more complex, workers become more removed from the decision-making apparatus, which creates a sense of powerlessness in the workplace. Powerlessness may increase stress by alienating workers from both their work and their organization. The workers may feel that they make no contribution to decisions on policy issues that have an effect on their worklife and may feel that the administration cares very little about their suggestions. Powerlessness may thus result in a combination of feelings of alienation and neglect, leading workers to question their involvement in the organization (Brief, et al., 1981; French and Caplan, 1972; Kahn et al., 1964). This may lead to a high level of reported stress.

Power is multidimensional. Authority connotes whether an actor has the final say in the decision-making process. One must distinguish between how much formal authority workers have in the decision-making process, and their reported level of decisional deprivation, the difference between the amount of influence employees believe they should have and the amount they report having.

Influence is broader in scope than authority because it connotes informal power (Bacharach and Lawler, 1980). Decisional deprivation, measured in terms of influence in decision-making, has broader scope than the authority measure. Lower echelon workers may be denied formal authority by virtue of their position in the organizational hierarchy; nonetheless they may still have the sense that they should have influence over certain kinds of decisions in the organization.

Hypothesis 6: In organizations in which the reported level of total authority is lower, the reported level of stress will be higher.

Hypothesis 7: In organizations in which the reported level of decisional deprivation is higher, the level of reported stress will be higher.

In regards to the hypotheses on power, the reverse arguments could also be made. It may be the case that certain workers view participation as a burden and therefore what we conceive as power becomes stress-inducing rather than stress-reducing.

To measure authority and decisional deprivation, we asked respondents to indicate which of the following areas they have authority and influence over. Also, they were asked to specify over which areas they felt they should have influence over.

1. Transportation
2. Student scheduling
3. Facilities planning
4. Integration/segregation
5. Budget development
6. Expenditure priorities
7. Cash flow/borrowing
8. Negotiations with professional staff
9. Negotiations with non-instructional staff
10. Contract implementation
11. Employee strikes/grievances
12. Staff hiring
13. Personnel evaluation

14. Student discipline
15. Standardized testing
16. Grading
17. Student rights
18. Program analysis/evaluation
19. What to teach
20. How to teach
21. What books to use
22. Special programs
23. Community relations

The measure of teachers' authority was computed as the sum of the responses (1 = feels that he/she has authority, 0 = does not feel that he/she has authority).

The second measure employed in this model, decisional deprivation, was computed as the difference between the total influence teachers felt they should have over the twenty-three issue areas and the total influence they believed they actually had over the same issues.

Communication

The communications network within an organization may play a critical role in the reduction of stress. This operates on two levels. First, communication may provide the worker with needed information, reducing levels of uncertainty. Second, by establishing contacts within the organization, the worker becomes a part of a network of social support (Cobb, 1976).

In dealing with stress, it is critical to differentiate between communication with superiors and communication with peers (Brief et. al., 1981). Communication with superiors may provide subordinates with critical

information and instructions, while at the same time personalizing the supervisor-subordinate relationship, thereby reducing stress. On the other hand, it is plausible that communication with superiors will be viewed by subordinates as a mode of control, making the subordinates more guarded, thereby increasing the level of reported stress. Basing an hypothesis on the former assumption, we would predict that:

Hypothesis 8: In organizations in which the level of communication with superiors is higher, the level of reported stress will be lower.

Building this eighth hypothesis on the first assumption is especially appropriate in schools, where the immediate superiors are most often colleagues; they have come from the ranks of the teachers, and may indeed be viewed as peers.

Communication with immediate peers may be an informal source of information for workers, while at the same time being an explicit source of social support. Thus:

Hypothesis 9: In organizations in which the level of reported communication with peers is higher, the level of reported stress will be lower.

The patterns of communication were measured by asking respondents to indicate how often they interact directly or indirectly with various people or groups of people in a typical month. The first variable represents the response with respect to direct and indirect contacts with teachers, while the second variable, contacts with supervisors, was constructed by adding the total contacts with principals and the total contacts with department heads. It should be noted that on the elementary level of analysis, grade supervisors or grade chairpersons were deemed equivalent to the secondary school department heads.

Career Development

The perception of the career path may be viewed as a source of stress on the job (Brief, et al., 1981). To the extent that career development factors are indicative of the future status within the organization, or expected rewards, this could indeed have a profound effect upon the level of stress. Of special importance is the certainty with which workers view their career pattern in the organization. We assume that in organizations in which employees are certain about their career opportunities, the average level of reported stress will be lower.

We view career development in terms of promotion. Specifically, two measures are employed: The perceived certainty of promotional opportunity, and the perceived rationality of the promotion process itself.

Hypothesis 10: In organizations in which respondents were more certain about the opportunity for promotion, and in organizations in which respondents view the promotion process as more rational, the level of reported stress will be lower.

In measuring the two variables employed in this model, we asked respondents the following questions:

1. How certain are you of the opportunities for promotion and advancement which will exist in the next four years? (1 = very uncertain, 4 = very certain)
2. To what degree do you think that promotion in this school is basically a rational process? (1 = not at all, 5 = a great deal)

Classroom Environment

The immediate work environment is critical in understanding the degree to which stress is encountered. With respect to teachers, three variables seem especially important: the degree to which the teacher sees the class size as too large, the degree to which the teacher perceives the students

as capable and willing to learn, and the teacher's perception of student behavior.

The perception of the class size as too large implies that the teacher feels that the work environment is not conducive to the proper performance of his or her primary work activities. That is, the administrative and supervisory duties involved in conducting large classes may be such that it will increase the level of teachers' perceived stress.

Hypothesis 11: In organizations in which the perception of the class size as being too large is higher, the average level of reported stress will be higher.

Student achievement is reflective of teacher goals and teacher ability. Students who succeed in their schoolwork become symbols of teacher goal achievement and teaching quality. If teachers believe that their students are unwilling or incapable of learning they may be in a stressful position.

Hypothesis 12: In organizations in which teachers perceive students' learning as poorer, the average level of reported stress will be higher.

Student behavior is the most noted predictor of teacher stress. It has generally been assumed that unruly students produce an environment that is stressful to teachers.

Hypothesis 13: In organizations in which the teacher's perception of negative student behavior is higher the level of reported stress will be higher.

The first variable included in the model was the response to the following question:

Based on your experience as a teacher in this school, please indicate

how true the following statement is:

My classes are too large.

[1 = definitely true, 4 = definitely false]

The variable, perception of student learning, had six component questions:

1. My students are highly motivated.
2. My students are quite intelligent.
3. Parents see that students do their homework.

   The above are coded 1 = definitely false, 4 = definitely true.

4. My students do not have sufficient background knowledge for my classes.
5. There are always one or two students who hold back the rest of the class.
6. No matter what I do, there are always some who seem to learn nothing.

   The above are coded 1 = definitely true, 4 = definitely false.

The last variable, perception of student behavior, was coded on the same scale and included the responses to the following survey items.

1. My students are often abnormally unruly.
2. I have to worry about being physically confronted by my students.
3. My classroom and the school are objects of vandalism.
4. Students use drugs and alcohol while in school.

Insert Table 2 about here

Table 3 presents the results of the correlation and regression analysis for each of the models to be discussed below. Insofar as we are concerned with isolating the strongest predictor(s) of stress in these models, we will emphasize the regression analysis in our discussion.

Insert Table 3 about here

Model I: Staffing and Enrollment

The first hypothesis, concerning enrollment, is only partially sustained for elementary schools, while it is wholly unsupported for secondary schools. For neither elementary nor secondary schools does enrollment have a statistically significant effect on our measures of reported stress.

The student/teacher ratio appears to be an important predictor of stress in elementary schools, yet it fails to emerge as a significant predictor in the secondary schools. Model I in Table 3 shows the relationship between the student/teacher ratio and the various stress scales. The relationships are significant in both the regression and correlation analyses for elementary schools (beta = .47 for psychological stress, beta = .32 for physiological stress).

These findings imply that size, by itself, is not a predictor of stress. When size is measured in terms of the student/teacher ratio however it does emerge as a significant predictor on the elementary but not the secondary level. There may be good reason to take note of the distinction between the stress stimulus effect on the elementary level versus the secondary level. As alluded to in the introductory portions of this paper, the differences in the organizational realities in the secondary and elementary schools may be important in the consideration of stress, especially with respect to job redesign and the development of coping mechanisms.

Consider the finding of the effect of student/teacher ratio on stress in the context of the different demands in the two types of organizations. In secondary schools, the teacher's primary responsibility is to teach a particular subject matter to several groups of students over several limited intervals of time. In elementary schools, the teacher is called upon to teach numerous subjects over longer intervals generally involving extended periods of contact with the same group of students. The nature of secondary education allows the teacher to present material in a relatively programmed fashion, especially in the context of the New York State Regents curriculum. The primary concern of the secondary school teacher is with the material. The primary concern of the elementary school teacher is with the student. For elementary school teachers, each additional student makes it more difficult to achieve their basic goal: to teach a broad range of subjects, to impart social values, to keep discipline over relatively long periods of time, etc. For secondary school teachers, whether one lectures to fifteen or twenty students may make little difference in the level of stress. It should be noted that in this discussion, we have treated student behavior as a constant. We shall return to this variable later to see how it modifies this argument.

Again, the difference between the organizational realities of elementary and secondary schools is significant when considering the effect of teaching support on stress. For elementary schools, our hypothesis that the higher the ratio of teaching support the lower the reported stress is totally unsupported. On both stress scales, the regression and correlation coefficients are significant and positive, indicating that the alternative hypothesis is supported (beta = .28 for psychological, and beta = .30 for physiological stress). This would imply that, on the

elementary level, the burden of supervising teaching assistants outweighs the beneficial effect of their support.

On the other hand, in secondary schools the relationships are negative with regards to the ratio of teaching support and stress. Although the only significant relationship emerges with self-reported psychological stress (beta = -.30), this finding is worth noting. Apparently the burden of supervision does not enter into the secondary school relationship in the same way as it did in the elementary school analysis: the higher the ratio of teaching support, the lower the reported level of stress.

Model II: Supervision

In elementary schools, both positive and negative supervisory behavior show a significant relationship to physiological stress (beta = -.39 and beta = .26 respectively). It should be noted that neither of the supervision measures appears to be a significant predictor of psychological stress as reported by elementary school teachers.

Examining the model for secondary schools, for psychological stress, positive supervision appears to be the more significant predictor (beta = -.46 for positive supervision, beta = .22 for negative supervision). For physiological stress, both positive supervision (beta = -.34) and negative supervision (beta = .28) remain significant in the regression equation. Apparently both appreciation and critical orientation are important in accounting for the level of reported stress by teachers. Although it may appear that secondary school teachers are more sensitive to supervisory behavior patterns than elementary school teachers, it may be the case that the underlying structural differences between supervisory processes in elementary and secondary s hools account for some of the variance. There is a much more

defined supervisory structure in secondary schools, making the source of criticism or support more specific. The specificity of criticism or support may increase the influence on teacher stress on supervisory behavior, thus accounting for the overarching importance of all forms of supervisory behavior on the secondary level.

Model III: Work Process

Model III in Table III presents the data regarding our fifth hypothesis. For both the elementary and secondary school levels, role ambiguity is a significant correlate and predictor of both dimensions of stress. The implication is that the more uncertainty teachers must deal with regarding their role, the more likely they are to report specific stress symptoms. The role ambiguity argument is based upon the notion of uncertain expectations in regards to work activities. Uncertain expectations are seen as undesireable and are therefore stress inducing.

In discussing hypothesis five, recall that we offered a reverse logic: too much certainty may be alienating due to the mundaneness of the work activity and thereby result in stress. Some weak evidence in this regard is found when examining routinization. Routinization is a significant correlate of both forms of stress, for both elementary and secondary school levels, with the exception of the relationship between psychological stress and routinization on the elementary school level. When routinization is entered into the same regression model as role ambiguity, its significance on the secondary level is restricted to physiological stress (beta = .26). On the elementary level, routinization remains significant again with respect to physiological stress (beta = .23).

Routinization appears to manifest itself in physiological reports

of stress. That is, a high level of routinization appears to lead to a more physically taxing work experience. However, because of the slight impact on the psychological dimension of stress, it is difficult to draw a conclusion regarding the alienating effect of routinization.

Model IV: Participation in Decision-Making

Model IV in Table III presents the results of the model concerning stress and the participation in decision-making. Our sixth hypothesis stated that the lower the level of total authority, the greater the level of reported stress. Implied here is that powerlessness is conducive to increased reports of stress symptoms. However, recalling that authority was presented as the formal dimension of power in the decision making process, it is not surprising that no significant relationships emerged. Teachers, as lower echelon employees, probably do not expect to have the final say over decisions in the workplace, and therefore the absence of that power does not emerge as stress-inducing.

As we argued in the hypothesis section, lower echelon personnel may be denied formal authority by virtue of their position in the formal hierarchy, but they may still have the sense that they deserve influence over particular areas. Hence, decisional deprivation, measured in terms of influence over decision-making, may have a greater effect on reported stress. We do, in fact, find that decisional deprivation has a strong effect on measures of stress on the elementary school level, but less of an effect on stress on the secondary school level. On the elementary school level, decisional deprivation is a strong correlate of both measures of stress. When entered into a model with authority, it remains significant (beta = .51 for psychological stress, beta = .58 for physiological stress). On the secondary level, the only strong

relationship emerges in regards to reported symptoms of psychological stress (beta = .30).

The differences in results between elementary and secondary schools are consistent with our conception of the differences between the two school organizations. In elementary schools, teachers probably feel that they should have more influence over their work environment since they are responsible for a single group of students and a particular classroom setting. In secondary schools, teachers are also less likely to be deprived of a forum for voicing influences; there are regular faculty meetings on departmental levels, and an apparatus exists for subject teachers to have a direct influence over the conduct of work in their particular departments. This is not necessarily so in the elementary grades. To summarize: in elementary schools, teachers may feel that they deserve a greater influence over their work. They also may not have available to them immediate forums in which to voice their influence. Both of these factors exacerbate the problem of decisional deprivation and hence may be stress inducing.

Model V: Patterns of Interaction

Our eighth hypothesis maintained that the greater the number of reported contacts between supervisors and teachers, the lower the level of reported stress. Most of the relationships in Model V are negative, and the only significant relationships emerge on the elementary school level, where contacts with supervisors are significantly related to both measures of stress. For secondary schools, a strong pattern does not emerge.

Our ninth hypothesis maintained that in organizations in which teachers reported higher levels of contact with other teachers the level of reported stress would be lower. On the elementary school level, we find no significant

correlations, and on the secondary school level we find only one weak correlation, that between contacts with peers and psychological stress.

When both independent variables, i.e., contact with supervisors and contact with fellow teachers, are entered into the same model, only the measure of contact with supervisors in elementary schools is a consistent predictor of stress, thus confirming the eighth hypothesis on this level (beta = -.26 for psychological stress and beta = -.40 for physiological stress).

Model VI: Career Development

The tenth hypothesis states that the greater the certainty about the opportunity for promotion and the more rational the view of the promotion process, the lower the reported stress. The zero-order correlations for elementary and secondary schools support the hypothesis. What is interesting is what occurs when the perception of the certainty of opportunity for promotion and the rationality of promotion are entered into the same regression model. For elementary schools, rationality of promotion is the predominant predictor for modes of stress (beta = -.65 for psychological stress, beta = -.62 for physiological stress). For the secondary school level it is also the rationality of promotion rather than the certainty of opportunity for promotion that is the primary predictor (beta = -.59 for psychological stress, beta = -.50 for physiological stress).

Apparently teachers' primary concern in both elementary and secondary organizations is the rationality of the promotion process itself rather than the perceived opportunity of promotion.

Model VII: Classroom Environment

The general pattern of correlations presented for the perception of class size and stress seem to support our hypothesis for both elementary and secondary schools. That is, for both levels, when teachers perceive the class size as being too large, they tend to report a high number of stress symptoms. Similar support is found in regards to student behavior. The zero-order correlations indicate that the more teachers perceive students as poorly behaved, the more stress symptoms teachers report. Again, parallel findings emerge with the zero-order correlations between student learning and stress symptoms. In elementary and secondary schools alike, all of the stress measures are negatively correlated with the teachers' positive view of student learning.

It is interesting to observe what occurs when all three variables are entered into the same regression model. In the elementary schools, the perception of class size emerges as the most consistent predictor (beta = -.40 for psychological stress, beta = -.34 for physiological stress). Student behavior remains significant only for symptoms of physiological stress (beta = -.26), as does student learning (beta = -.37). It is clear that although all three dimensions of classroom environment seem to affect the degree of physiological stress, the strongest predictor across categories for elementary schools is teachers' perception of class size.

In contrast, on the secondary level, the only significant betas emerge in regards to the relationship between the stress measures and student behavior (beta = -.27 for psychological stress, beta = -.32 for physiological stress). Although the correlations for

perception of classroom size and student learning were significant, neither emerge as predictors when entered into regression models with the variable perception of student behavior.

The important point of contrast between elementary and secondary levels, then, is the emergence of the perception of classroom size as the primary predictor of stress symptoms on the elementary level, while the perception of student behavior emerges as the sole predictor on the secondary level. This finding directly reinforces our finding regarding student/teacher ratio, that for elementary schools the ratio emerged as an important predictor of stress symptoms, yet it failed to emerge in secondary schools. To explain the effect of the student/teacher ratio, we argued that elementary school teachers have a more encompassing educational responsibility for a single group of students over longer intervals of time than do secondary school teachers, and hence they are more sensitive to changes in class size. Secondary teachers, who have relatively limited contact with a varied number of students over shorter intervals of time would be less concerned with the size of the class. Instead, they are more concerned with the quality of student behavior, which they may view as an obstacle to their more focused goal, getting the subject material across to the class. For secondary school teachers, student behavior is either an asset or impediment to attaining their specific goal, whereas for elementary school teachers, student behavior is a goal that may be impeded by classroom size.

Integrative Models

Table 4 presents four integrated models predicting to each type of stress in each type of school. Each of the models represents the results of a stepwise procedure in which each of the previously significant ($p < .05$) variables was entered. Analysis was limited to the five independent variables

which together explained the greatest amount of variance in the stress measure in question (i.e., maximum R^2). This is not to imply that other variables are not important; it is simply to place primary emphasis, at this stage of our analysis, on parsimony.

Table 4 includes findings regarding the dimensions of elementary school organizations which induce psychological stress. Rationality of the promotion process and the student/teacher ratio emerge as the strongest predictors of psychological stress (beta = -.40 and beta = .31). In elementary school organizations in which teachers reported that the promotion process was rational, teachers are less likely to experience stress. Likewise, in elementary school organizations with a low student/teacher ratio, the reported level of psychological stress is also likely to be low.

Insert Table 4 about here

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in elementary schools

In Table 4 we discover that/the rationality of the promotion process is a strong predictor of physiological stress (beta = -.32), whereas the importance of the student/teacher ratio drops (beta = .16). Role ambiguity (beta = .31), perception of student learning (beta = -.28), and negative supervisory behavior (beta = .20) all remain significant predictors of physiological stress.

Psychological stress in secondary school organizations as presented in Table 4, is best predicted by role ambiguity (beta = .30), positive supervisory behavior (beta =-.39), and the teaching support ratio (beta = -.23). Physiological stress is best predicted by the perception of the rationality of the promotion process (beta =-.26) and perception of student behavior (beta = -.22).

These integrated models must be interpreted with caution. The statistical procedure used to generate them puts a premium on identifying variables which account for different portions of the variation in the dependent stress measures.

If two variables account for roughly the same part of the variation in stress, the procedure will overlook one of them and select another variable that accounts for a different part of the variation, even if that other variable accounts for less variation than the one rejected. (For example, perception of class size does not appear in either of our elementary models, presumably because student/teacher ratio accounts for roughly the same variation.) In any study which examines various dimensions of organizational structure and work processes, there will be relationships (perhaps even direct causal relationships) among the dimensions examined. Without a set of a priori hypotheses about what those relationships might be, we cannot conclude that the results of our stepwise procedures have identified the "most" important variables predicting to each type of stress in each type of school.

Nevertheless, these integrated models reaffirm two points which we have already made and allow us to make two further observations. First, there are distinct differences between our elementary and secondary school models, reaffirming our argument that stress is a function of different elements in the two organizational environments. Second, there are also distinct differences between models which focus on psychological stress and those which focus on physiological stress. Our original hypotheses did not posit what those differences might be, and for the most part we have resisted the temptation to offer post hoc explanations for them, but clearly, future research on the organizational determinants of stress will miss

important phenomena if attention is confined to one or the other measure. Third, each of our four integrated models includes statistically significant variables from at least two of the seven separate models presented earlier. The only separate models which are not "represented" by a variable with statistical significance in at least one integrated model are those for participation in decision-making and communication; only the latter is not "represented" at all. Thus, no one dimension of organizational structure or work processes provides a sufficient explanation for the stressful effects an organization can have on its employees. Fourth, and most importantly, the four integrated models presented here account for half to two-thirds of the measured variation in stress across the schools covered by our study. Having controlled for individual teacher differences by aggregating both our independent and dependent measures to the level of the organization, there could hardly be more straight-forward evidence that organizational structures and work processes are, in fact, important determinants of stress.

Conclusion

In this paper we have presented only a preliminary analysis of organizational predictors of stress in elementary and secondary school organizations. Several important implications may be drawn from this work.

Stress may be conceptualized as arising from organizations, not simply from the idiosyncracies of individuals. Organizational work processes and structures have different effects on various measures of self-reported physiological and psychological stress. Furthermore, we have shown that the effect of organizational work processes and structures will have different effects on teacher stress depending upon whether we consider elementary school organizations or secondary school organizations.

The importance of this type of analysis lies in the implications for organizational and work design. By viewing stress as a product of the organization, we have placed the ability to alleviate stress as much with management as with the individual worker. Stress is an important measure of the quality of working life, and to the degree that management is responsible for the enhancement of the quality of the working life of the employee, management should assume responsibility for altering organizational structures and work processes in ways that are likely to limit the incidence of worker stress.

TABLE 1

Means, Ranges, and Standard Deviations of Stress Scales

Elementary School, n = 42

Variable	Mean	High	Low	Standard Deviation
Psychological Stress	1.476	1.920	1.160	.204
Physiological Stress	1.445	1.943	1.125	.179

Secondary School, n = 45

Variable	Mean	High	Low	Standard Deviation
Psychological Stress	1.495	2.025	1.200	.173
Physiological Stress	1.387	1.875	1.175	.139

TABLE 2

Variable	Organizational Level	$\bar{x}$	S.D.	high	low	Cronbach's alpha (where applicable)
*total enrollment	elementary	505.333	166.896	841.00	166.00	
	secondary	947.600	693.566	3784.00	199.00	
*student/teacher ratio	elementary	20.130	2.422	28.167	15.967	
	secondary	18.330	2.400	22.703	12.438	
*teaching support ratio	elementary	.137	.335	1.818	0.000	
	secondary	.024	.072	.313	0.000	
*administrative support ratio	elementary	.045	.031	.182	0.00	
	secondary	.404	.015	.074	0.00	
positive supervisory behavior	elementary	2.135	.315	2.933	1.200	.789
	secondary	2.141	.295	2.744	1.500	
negative supervisory behavior	elementary	1.137	.269	2.214	1.000	.630
	secondary	1.438	.297	2.33	1.020	
role ambiguity	elementary	2.400	.353	3.250	1.500	.729
	secondary	2.599	.281	3.472	1.924	
routinization	elementary	1.836	.211	2.286	1.250	.727
	secondary	2.028	.151	2.350	1.650	
teacher authority	elementary	3.818	1.127	6.500	1.875	
	secondary	3.195	1.035	5.500	.818	
decisional deprivation	elementary	5.244	1.863	8.333	1.750	
	secondary	4.891	1.601	9.867	1.318	
contacts with teachers	elementary	23.766	15.310	84.667	6.125	
	secondary	20.579	8.246	43.050	7.375	
contacts with supervisors	elementary	14.140	8.130	48.430	4.495	
	secondary	16.516	6.419	30.800	4.833	

Variable	Organizational Level	$\bar{x}$	S.D.	high	low	Cronbach's alpha (where applicable)
certainty of promotional opportunity	elementary	2.361	.510	4.000	1.400	
	secondary	2.443	.336	3.111	1.625	
rationality of promotion	elementary	2.725	.430	3.600	1.833	
	secondary	2.593	.423	3.412	1.429	
perception of class size as too large	elementary	2.636	.410	3.500	1.714	
	secondary	2.859	.308	3.667	2.130	
perception of student learning	elementary	2.486	.275	3.056	2.010	.662
	secondary	2.248	.189	2.821	1.818	
perception of student behavior	elementary	3.508	.201	3.875	3.100	.564
	secondary	2.917	.220	3.517	2.500	

* These variables were supplied by the State Department of Education
N = 42 elementary schools
N = 45 secondary schools

TABLE 3

Dependent Variables

Independent Variables	Elementary Schools (N = 42)				Secondary Schools (N = 45)			
	Psychological stress		Physiological stress		Psychological stress		Physiological stress	
	r	beta	r	beta	r	beta	r	beta
Model I:								
student/teacher ratio	.49***	.47***	.31**	.32***	-.08	-.11	-.04	-.11
ratio of teaching support	.31**	.28**	.37***	.30**	-.28**	-.30**	-.20*	-.21
ratio of administrative support	.09	-.05	.17	.13	-.07	-.02	-.14	-.09
enrollment	-.23*	-.11	-.04	.13	-.11	-.04	.02	.07
Model II:								
positive supervisory behavior	-.19	-.12	-.48***	-.39***	-.58***	-.46***	-.49***	-.34**
negative supervisory behavior	.24*	.20	.39***	.26**	.47***	.22*	.47***	.28**

	Elementary Schools				Secondary Schools			
	Psychological stress		Physiological stress		Psychological stress		Physiological stress	
Independent Variables	r	beta	r	beta	r	beta	r	beta
Model III:								
routinization	.06	.07	.23*	.23**	.36***	.09	.46***	.26**
role ambiguity	.58***	.58***	.64***	.65***	.61***	.57***	.57***	.46***
Model IV:								
teacher authority	.06	.18	.01	.15	-.24*	-.13	-.17	-.11
decisional deprivation	.47***	.51***	.55***	.58***	.35***	.30**	.20*	.17
Model V:								
contacts with teachers	.03	.10	-.12	-.01	-.30**	-.21	-.12	-.14
contacts with supervisors	-.23	-.26*	-.40***	-.40***	-.28**	-.16	-.05	.04
Model VI:								
certainty of promotional opportunity	-.36***	-.02	-.36***	-.04	-.23*	.06	-.32**	-.07
rationality or promotion	-.66***	-.65***	-.64***	-.62***	-.56***	-.59***	-.54***	-.59***

	Elementary Schools				Secondary Schools			
	Psychological stress		Physiological stress		Psychological stress		Physiological stress	
Independent Variables	r	beta	r	beta	r	beta	r	beta
Model VII:								
perception of class size as being too large	-.43***	-.40***	-.39***	-.34***	-.26**	-.19	-.24*	-.15
perception of student behavior	-.32**	-.20	-.42***	-.26**	-.40***	-.27**	-.44***	-.32***
perception of student learning	-.29**	-.20	-.47***	-.37***	-.34***	-.23	-.35***	-.22

*p ≤ .10
**p ≤ .05
***p ≤ .01

TABLE 4

Variables Entering Into Regression Models

Dependent Variable		Independent Variables

Psychological Stress (elementary schools)	=	rationality of promotion process (beta = -.40***);
		student/teacher ratio (beta = .31***);
		decisional deprivation (beta = .17);
		role ambiguity (beta = .15);
		teaching support ratio (beta = .07).
		
		R^2 = .61

Physiological Stress (elementary schools)	=	role ambiguity (beta = .31***);
		rationality of promotion process (beta = -.32***);
		perception of student learning (beta = -.28***);
		negative supervisory behavior (beta = .20***);
		
		student/teacher ratio (beta = .16*).
		
		R^2 = .66

Psychological Stress (secondary schools)	=	role ambiguity (beta = .30***);
		positive supervisory behavior (beta = -.39***);
		ratio of teaching support (beta = -.23***);
		decisional deprivation (beta = .16);
		perception of student behavior (beta = -.11).
		
		R^2 = .57

Physiological Stress (secondary schools)	=	role ambiguity (beta = .19);
		rationality of promotion process (beta = -.26**);
		perception of student behavior (beta = -.22*);
		routinization (beta = .14);
		positive supervisory behavior (beta = -.13).
		
		R^2 = .47

N = 42 elementary schools
N = 45 secondary schools
* $p < .10$
** $p < .05$
*** $p < .01$

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